CLAIMS

Sub A1

1. Biological material for preparing pharmaceutical compositions intended for treating mammals, comprising:

- either at least one nucleic acid sequence containing at least one gene of therapeutic interest and elements which ensure the expression of said gene *in vivo* in target cells intended to be genetically modified with said nucleic acid sequence;

- or at least one target cell which does not naturally produce antibodies and which is genetically modified *in vitro* with at least one nucleic acid sequence above,

characterized in that said gene of therapeutic interest encodes all or part of an antibody which will be expressed at the surface of said target cell, and in that said antibody is capable of binding to a polypeptide which is present at the surface of a cytotoxic effector cell or of a helper T lymphocyte, and which is involved in the process of activation of such a cell.

2. Biological material according to claim 1, characterized in that said nucleic acid sequence is in the form of a naked DNA or RNA sequence.

3. Biological material according to claim 1, characterized in that said nucleic acid sequence is a vector which allows the transfer of said gene of therapeutic interest into said target cells.

4. Biological material according to claim 3, characterized in that said vector is a viral vector.

5. Biological material according to claim 4, characterized in that said viral vector is an adenoviral or retroviral vector, or a poxvirus, in particular derived from the vaccinia virus or from the Modified Virus Ankara (MVA).

6. Biological material according to claim 3, characterized in that said vector consists of at least one said nucleic acid sequence complexed with or

conjugated to at least one carrier molecule or substance selected from the group consisting of a cationic amphiphile, in particular a cationic lipid, a cationic or neutral polymer, a protic polar compound in particular chosen from propylene glycol, polyethylene glycol, glycerol, ethanol and 1-methyl-L-2-pyrrolidone or their derivatives, and an aprotic polar compound in particular chosen from dimethyl sulfoxide (DMSO), diethyl sulfoxide, di-n-propyl sulfoxide, dimethyl-sulfone, sulfolane, dimethylformamide, dimethyl-acetamide, tetramethylurea and acetonitrile, or their derivatives.

7. Biological material according to any one of the preceding claims, characterized in that said nucleic acid sequence contains a gene encoding the heavy chain of an antibody capable of binding to a polypeptide which is present at the surface of a cytotoxic effector cell or of a helper T lymphocyte, and which is involved in the process of activation of such a cell, fused with a transmembrane polypeptide.

8. Biological material according to claim 7, characterized in that said nucleic acid sequence also contains a gene encoding the light chain of an antibody capable of binding to a polypeptide which is present at the surface of a cytotoxic effector cell or of a helper T lymphocyte, and which is involved in the process of activation of such a cell.

9. Biological material according to either of claims 7 and 8, characterized in that said transmembrane polypeptide is selected from the group consisting of a glycoprotein, a lipoprotein and a membrane receptor.

10. Biological material according to claim 9, characterized in that said transmembrane polypeptide is selected from the group consisting of the rabies virus glycoprotein, gp160 and CD4.

11. Biological material according to any one of the preceding claims, characterized in that said polypeptide which is present at the surface of a

cytotoxic effector cell or of a helper T lymphocyte, and which is involved in the process of activation of such a cell, is a receptor.

12. Biological material according to claim 11, characterized in that said cytotoxic effector cell is selected from the group consisting of macrophages, cytotoxic T lymphocytes (TCLs) and killer cells (NKs), or their derived cells.

13. Biological material according to either of claims 11 and 12, characterized in that said receptor is selected from the group consisting of all or part of the TCR complex, more particularly TCR-α, TCR-β or CD3, CD8, CD4, CD28, LFA-1, 4-1BB, CD47, CD2, CD9, CD45, CD40, receptors for cytokines, such as IL-7, IL-4, IL-2, IL-15 or GM-CSF, Vα14NKT, NKAR and the Fc receptor.

14. Biological material according to any one of the preceding claims, characterized in that said target cell is a mammalian tumor cell, a mammalian cell infected with a viral pathogenic agent, or a mammalian cell infected with a bacterial pathogenic agent.

15. Biological material according to claim 1, characterized in that it consists of at least one target cell which does not naturally produce antibodies, in a form which allows their administration to the body of a mammal, and optionally their culturing beforehand, said cell being genetically modified *in vitro* with at least one nucleic acid sequence containing at least one gene encoding all or part of an antibody which is expressed at the surface of said target cell, and in that said antibody is capable of binding to a polypeptide which is present at the surface of a cytotoxic effector cell or of a helper T lymphocyte, and which is involved in the process of activation of such a cell.

16. Biological material according to claim 15, characterized in that said target cells originate from the mammal to be treated.

17. Biological material according to claim 15, characterized in that said target cells originate from a mammal other than the one to be treated and have undergone a treatment making them compatible.

18. Biological material according to one of claims 1 to 17, characterized in that it also comprises at least one DNA sequence which ensures the expression of a compound which is involved in the activation of cytotoxic effector cells or of helper T lymphocytes.

19. Use of a biological material according to one of claims 1 to 18 for preparing a pharmaceutical composition intended for treating or for preventing cancers or viral infections.

20. Use of a nucleic acid sequence containing at least one gene of therapeutic interest and elements which ensure the expression of said gene *in vivo* in target cells genetically modified with a said nucleic acid sequence, said gene of therapeutic interest encoding all or part of an antibody which is expressed at the surface of said target cell, and which is capable of binding to a polypeptide which is present at the surface of a cytotoxic effector cell or of a helper T lymphocyte, and which is involved in the process of activation of such a cell, for preparing pharmaceutical compositions intended for treating a mammal by gene transfer.

21. Pharmaceutical composition comprising a biological material according to one of claims 1 to 18, advantageously in combination with a pharmaceutically acceptable vehicle.

22. Pharmaceutical composition according to claim 21, comprising a biological material according to one of claims 15 to 17 and a compound which is naturally responsible for the activation of cytotoxic effector cells or of helper T lymphocytes.

23. Pharmaceutical composition according to claim 22, characterized in that said compound is a cytokine or a chemokine.

24. Mammalian cell which does not naturally produce antibodies, characterized in that it is genetically modified with at least one nucleic acid sequence containing at least one gene of therapeutic interest and elements which ensure the expression of said gene in said cell, said gene of therapeutic interest encoding all or part of an antibody which is expressed at the surface of said genetically modified cell, and in that said antibody is capable of binding to a polypeptide which is present at the surface of a cytotoxic effector cell or of a helper T lymphocyte, and which is involved in the process of activation of such a cell.

25. Method for preparing a cell according to claim 24, characterized in that at least one nucleic acid sequence containing at least one gene of therapeutic interest and elements which ensure the expression of said gene in said cell, said gene of therapeutic interest encoding all or part of an antibody which is expressed at the surface of said genetically modified cell, is introduced into a mammalian cell which does not naturally produce antibodies, by any suitable means, and in that said antibody is capable of binding to a polypeptide which is present at the surface of a cytotoxic effector cell or of a helper T lymphocyte, and which is involved in the process of activation of such a cell, and then in that, from these cells, those which are genetically modified with said nucleic acid sequence are chosen.